REMARKS/ARGUMENTS

The instant amendment is being submitted as part of an RCE application.

Re-examination and favorable reconsideration in light of the above amendments and the following comments are respectfully requested.

By the present amendment, all claims previously in the application have been cancelled in favor of new claims 34 - 52.

New independent claim 34 is directed to a method for heat treating at least one workpiece comprising the steps of: cleaning a furnace chamber to be used during said heat treating method; said cleaning step comprising injecting a gas only at a center of an area where the at least one workpiece is to be located within said furnace chamber, said injecting step comprising injecting said gas at a partial pressure and a flow rate sufficient to create a pressure differential which carries contaminants away from said center and toward an exit of said furnace chamber; said cleaning step further comprising applying heat at a temperature which is 200 to 300 degrees Fahrenheit above a temperature to be used in a subsequent diffusion heat treating step for at least 30 minutes; and after said cleaning step has been completed, diffusion heat treating said at least one workpiece in a gas atmosphere with said gas being injected only at said center.

Applicants have found that significant improvements can be made in heat treating coated workpieces by first cleaning the chamber in which the workpieces are to be placed in a way which moves contaminants away from the area in which the workpieces are to be located. To this end, Applicants perform the cleaning process by injecting a gas *only* at a center of the area of the furnace chamber where the workpieces are to be located. This is

illustrated in Figure 1 of the instant application. The gas, which is introduced solely at this location, is introduced at a partial pressure and a flow rate sufficient to create a pressure differential which carries contaminants away from said center and toward an exit of said furnace chamber. After cleaning has been completed, the at least one workpiece is placed in the cleaned chamber and subjected to a diffusion heat treatment where again the gas which is injected into the chamber is injected only at said center.

The improvements in the treated workpieces can be seen from Figures 2 to 4 in the application. Figure 2 illustrates a workpiece with an as deposited and diffused coating. Figure 3 illustrates a coating which has been formed using the method described herein and which was surface finished by shot peening. As can be seen from Figure 3, the coating is free of pores, voids, and other bad features. In fact, the coating is homogeneous and has very good ductility. Figure 4 illustrates a coating which was not formed using the clean furnace and heat diffusion treatment of the present invention. As can be seen from Figure 4, the coating has voids and fissures which makes it quite brittle.

In prior office action, claims have been rejected as being unpatentable over U.S. Patent No. 6,042,898 to Burns et al. alone and in combination with JP 6219810 or JP 2003027209. It is believed that these references do not render the subject matter of claim 34 obvious. Burns et al. is directed to a method for applying improved durability thermal barrier coatings. During the processing of the coated article in Burns et al., undesired oxides and contaminants are removed from a bond coat with an ionized gas stream cleaning process, such as a reverse transfer arc process. See column 3, line 33 to column

4, line 23 of Burns et al. Clearly, Burns et al. is not describing a technique for cleaning a furnace chamber prior to performing a diffusion heat treating step. Burns et al. is directed to cleaning a particular coating applied to an article. In other words, the article is already in the chamber during the cleaning operation. In contrast, Applicants are cleaning the chamber without any article or workpiece being present. Further, there is no disclosure in Burns et al. of injecting the gas used to remove the contaminants only at the center of the location where the workpieces are to be placed. Still further, there is no disclosure in Burns et al. of placing said at least one workpiece within said cleaned chamber and diffusion heat treating said at least one workpiece in a gas atmosphere with said gas being injected only at said center.

The two Japanese patent documents do not cure these deficiencies in Burns et al. JP 62139810 relates to a method and apparatus for cleaning the interior of a tempering furnace. There is no disclosure of injecting a gas only at the center of the location where workpieces are to be placed and there is no disclosure of injecting the gas at a partial pressure and a flow rate sufficient to create a pressure differential which carries contaminants away from said center and toward an exit of said furnace chamber. JP 2003027209 relates to a surface hardening treatment method for deep hole of parts in vacuum furnace. Here again, there is no disclosure of injecting a gas only at the center of the location where workpieces are to be placed and there is no disclosure of injecting the gas at a partial pressure and a flow rate sufficient to create a pressure differential which carries contaminants away from said center and toward an exit of said furnace chamber.

Still further, neither Japanese reference discloses the step of after said cleaning step has been completed, placing said at least one workpiece within said cleaned chamber and diffusion heat treating said at least one workpiece in a gas atmosphere with said gas being injected only at said center.

For these reasons, the subject matter of new claim 34 is not anticipated by or rendered obvious by these references.

Claims 35 - 47 are allowable for the same reasons as their parent claims as well as on their own accord.

New claim 48 is directed to a system for heat treating a coated workpiece comprising: a furnace having a chamber and an area for locating at least one workpiece within said chamber, said area having a center; means for cleaning said chamber prior to heat treating said coated workpiece; and said cleaning means comprising means for delivering a gas only at said center of said area for locating said at least one workpiece and at a partial pressure and a flow rate sufficient to carry any contaminants located within said chamber from said center toward an exit.

Claim 48 is allowable for the reasons discussed above.

Claims 49 - 52 are allowable for the same reasons as claim 48 as well as on their own accord.

For the foregoing reasons, the instant application is believed to be in condition for allowance. Such allowance is respectfully solicited.

Should the Examiner believe an additional amendment is needed to place the case in condition for allowance, he is hereby invited to contact Applicants' attorney at the telephone number listed below.

No fee is believed to be due as a result of this response. Should the Director determine that an additional fee is due, he

is hereby authorized to charge said fee to Deposit Account No. 21-0279.

Respectfully submitted,

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